

CLAIMS

What is claimed is:

1. A method for detecting emotion in a voice by utilizing statistics comprising the steps of:
- (a) providing a database having statistics including statistics of human associations of voice parameters with emotions;
 - (b) receiving a voice signal;
 - (c) extracting at least one feature of the voice signal;
 - (d) comparing the extracted voice feature to the voice parameters in the database;
 - (e) selecting an emotion from the database based on the comparison of the extracted voice feature to the voice parameters; and
 - (f) outputting the selected emotion.

2. A method as recited in claim 1, wherein the database includes probabilities of particular voice features being associated with an emotion.

3. A method as recited in claim 2, wherein the selection of the emotion from the database includes analyzing the probabilities and selecting the most probable emotion based on the probabilities.

4. A method as recited in claim 1, wherein the statistics in the database include self-recognition statistics.

5. A method as recited in claim 2, wherein the probabilities of the database include performance confusion statistics.

6. A method as recited in claim 1, wherein a plurality of features are extracted including the maximum value of the fundamental frequency, the standard deviation of the fundamental frequency, the range of the fundamental

4 frequency, the mean of the fundamental frequency, the mean of the
5 bandwidth of the first formant, the mean of the bandwidth of the second
6 formant, the standard deviation of energy, the speaking rate, the slope of the
7 fundamental frequency, the maximum value of the first formant, the
8 maximum value of the energy, the range of the energy, the range of the
9 second formant, and the range of the first formant.

1 7. A computer program embodied on a computer readable medium for detecting
2 emotion in a voice by utilizing statistics comprising:
3 (a) a code segment that provides a database having statistics including statistics
4 of human associations of voice parameters with emotions;
5 (b) a code segment that receives a voice signal;
6 (c) a code segment that extracts at least one feature of the voice signal;
7 (d) a code segment that compares the extracted voice feature to the voice
8 parameters in the database;
9 (e) a code segment that selects an emotion from the database based on the
10 comparison of the extracted voice feature to the voice parameters; and
11 (f) a code segment that outputs the selected emotion.

1 8. A computer program as recited in claim 7, wherein the database includes
2 probabilities of particular voice features being associated with an emotion.

1 9. A computer program as recited in claim 8, wherein the selection of the
2 emotion from the database includes analyzing the probabilities and selecting
3 the most probable emotion based on the probabilities.

1 10. A computer program as recited in claim 7, wherein the statistics in the
2 database include self-recognition statistics.

1 11. A computer program as recited in claim 8, wherein the probabilities of the
2 database include performance confusion statistics.

12. ¹⁴ A computer program as recited in claim ⁹7, wherein a plurality of features are extracted including the maximum value of the fundamental frequency, the standard deviation of the fundamental frequency, the range of the fundamental frequency, the mean of the fundamental frequency, the mean of the bandwidth of the first formant, the mean of the bandwidth of the second formant, the standard deviation of energy, the speaking rate, the slope of the fundamental frequency, the maximum value of the first formant, the maximum value of the energy, the range of the energy, the range of the second formant, and the range of the first formant.

13. A system for detecting emotion in a voice by utilizing statistics comprising:

- (a) logic that provides a database having statistics including statistics of human associations of voice parameters with emotions;
- (b) logic that receives a voice signal;
- (c) logic that extracts at least one feature of the voice signal;
- (d) logic that compares the extracted voice feature to the voice parameters in the database;
- (e) logic that selects an emotion from the database based on the comparison of the extracted voice feature to the voice parameters; and
- (f) logic that outputs the selected emotion.

¹⁶14. A system as recited in claim ¹⁵13, wherein the database includes probabilities of particular voice features being associated with an emotion.

¹⁷15. A system as recited in claim ¹⁸14, wherein the selection of the emotion from the database includes analyzing the probabilities and selecting the most probable emotion based on the probabilities.

¹⁹16. A system as recited in claim ²⁰15, wherein the statistics in the database include self-recognition statistics.

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